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GIGANTIC SOLENOGASTER (MOLLUSCA :
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NEOMENIIDAE), OCCURRING IN THE NORTH-
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**NEOMENIA YAMAMOTOI SPEC. NOV., A GIGANTIC SOLENOGASTER
(MOLLUSCA: CLASS SOLENOGASTRES, FAMILY NEOMENIIDAE),
OCCURRING IN THE NORTH-EASTERN PART OF JAPAN¹⁾**

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With Text-figures 1-9

The material dealt with in this paper is represented by a single individual which was brought by Mr. Torao Yamamoto from Muroran, Hokkaido in 1960, and submitted to Dr. Takasi Tokioka of the Seto Marine Biological Laboratory, Kyoto University, for identification. The specimen had been found by Mr. Yamamoto among the organisms that were obtained by dredging in the shrimp fishing ground off Muroran by a surveying boat of the Muroran Branch of the Hokkaido Fisheries Experimental Station and presented to him by courtesy of Mr. Kiyoshi Hayashi, the biologist at that branch station. As soon as it was found that the specimen belonged to Solenogastres, it was then forwarded to me, together with some notes and drawings made by Tokioka for examinations for further identification. It had been rather difficult for me to get any definitive clue for identification of such a gigantic solenogaster, never collected from the Pacific, particularly from the North Pacific even during the "Albatross" expedition (cf. Heath, 1911: 9-10). Quite recently, however, an opportunity was given to me by Dr. Luitfried von Salvini-Plawen of the I. Zoologisches Institut der Universität Wien, to compare features of my specimen with those of his gigantic *Neomenia* which was taken from near the Antarctic region, but still undescribed. On his information and following his suggestion, it was decided to record my specimen as the type of a new species which is distinguished from Salvini-Plawen's by differences seen in the constitution of the foregut, genital ducts and their accessories.

I would like to extend here my appreciation to the above-mentioned gentlemen by whose support the present paper has become to be published.

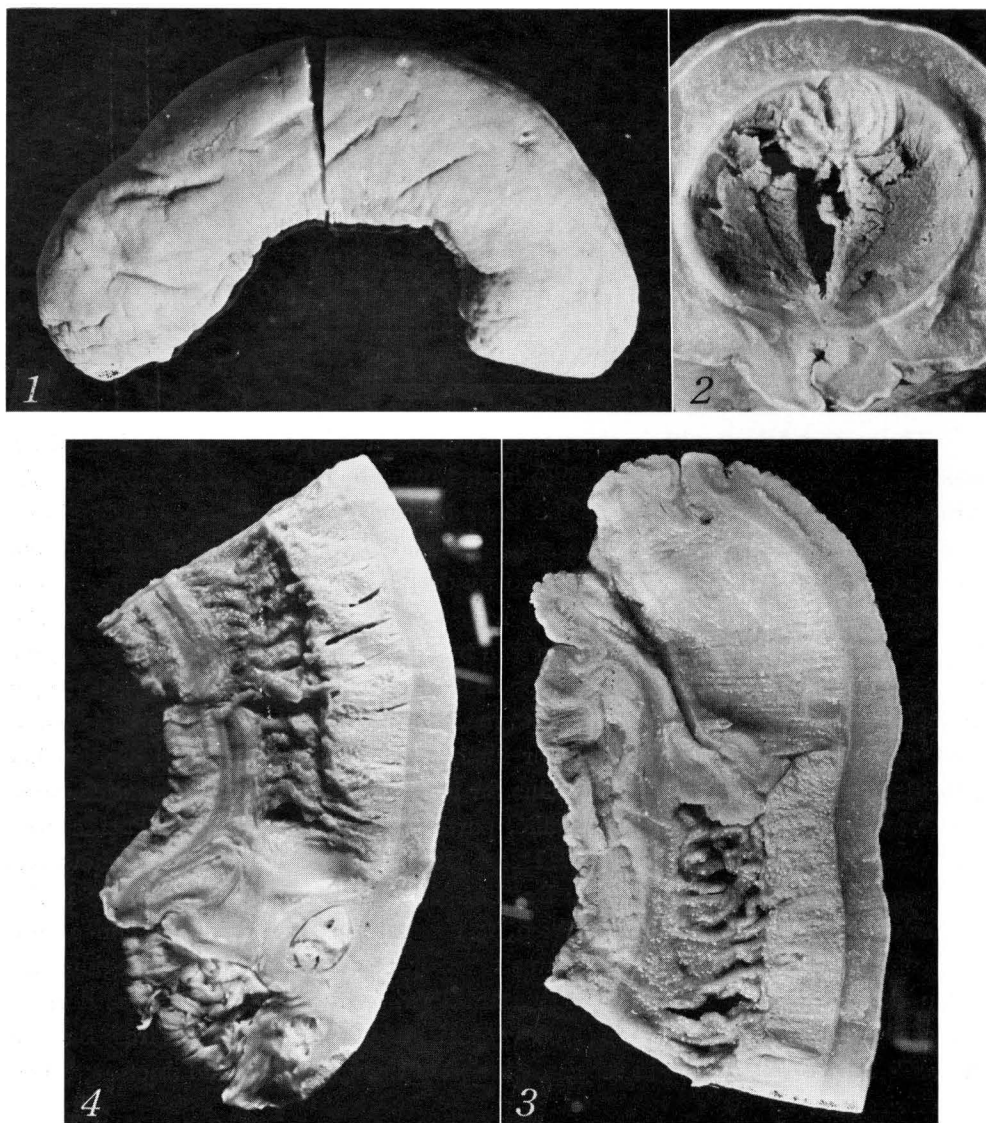
Neomenia yamamotoi Baba, spec. nov.

(Japanese name: Sangono-futohimo)

(Figs. 1-9)

Distribution: East coast of northern Japan: off Onahama (36° 56' N; 140°

1) Contributions from the Seto Marine Biological Laboratory, No. 606.



Figs. 1-4. *Neomenia yamamotoi* Baba, spec. nov. from off Muroran, Hokkaido, Japan

1. Preserved animal from the left side.
2. Transverse section of the body.
3. Median longitudinal section of the anterior half of the body, seen from the left side.
4. Median longitudinal section of the posterior half of the body, seen as above.

55' E; see Baba, 1939: 35, footnote 2), Fukushima-ken, Honsyu and off Muroran, Hokkaido (see below).

Type: Collected by a surveying ship of Muroran Branch of the Hokkaido Fisheries Experimental Station by dredging at a station ($42^{\circ} 7' N$; $141^{\circ} 18' E$) off Cape Chikyu-misaki of Muroran, Hokkaido, Japan, 160-200 m deep, on August 28, 1960.

External characters: The animal is fully matured. In the preserved, and hence in a more or less contracted, state, it is stoutish, measuring 100 mm long and 30 to 35 mm thick across the middle of the body. The whole animal is smooth on the surface, without a dorsal median crest, and rather soft in texture (figs. 1 and 5A). According to Dr. Tokioka's note the specimen after 2 months of preservation in 10% formaldehyde showed a brownish tinge dorsally, and a greenish hue towards the ventral side, but it is now grayish brown throughout the body.

As in *Neomenia carinata* Tullberg, 1875 of the North Atlantic which is the type of the genus and only 30 mm long, the body wall of this new species is thick and provided with a well-developed subepidermal connective tissue. The cuticle is thin as compared with the large body of the animal. It comprises a single layer of radiating

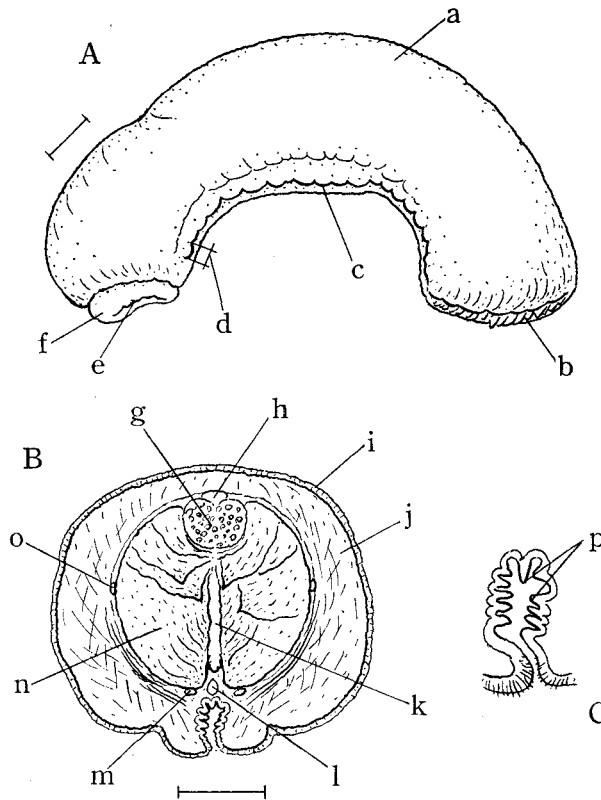


Fig. 5. *Neomenia yamamotoi* Baba, spec. nov.

A. Preserved animal from the left side (scale 10 mm), figured after Dr. T. Tokioka, but slightly altered.

B. Transverse section of the body at its midlength (scale 10 mm).

C. Pedal groove enlarged.

a - mantle; b - opening of the mantle-cavity; c - pedal groove; d - prepedal pit; e - mouth; f - proboscis appeared from the atrial opening; g - paired gonads; h - dorsal sinus; i - spiculated cuticle; j - subepidermal connective tissue; k - median lumen of the midgut; l - pedal sinus; m - pedal nerve cord; n - vertical glandular folds of the midgut; o - lateral nerve cord; p - pedal folds.

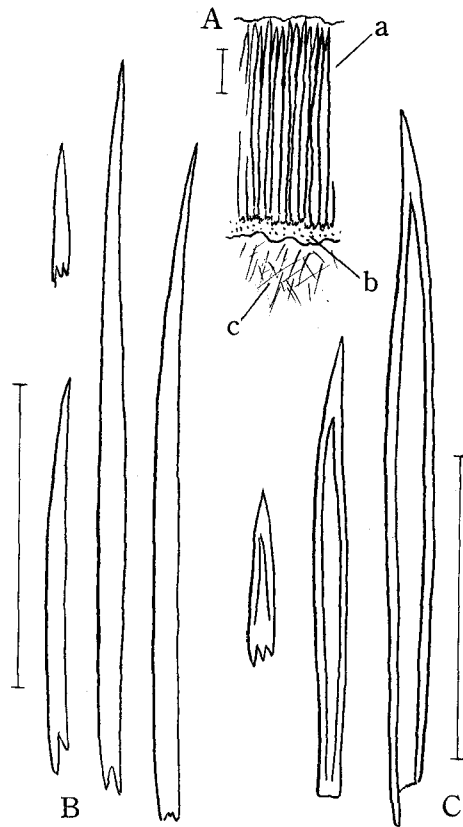


Fig. 6. *Neomenia yamamotoi* Baba, spec. nov.
 A. Vertical section of part of the mantle (scale 0.1 mm).
 B. Some examples of the solid spicules (scale 0.1 mm).
 C. Some examples of the grooved spicules (scale as above).
 a - cuticle; b - epidermis; c - subepidermal connective tissue.

spicules, the majority of which are solid and needle-shaped, but some of them may be broader and grooved along their length (fig. 6). The spicules near the lower borders of the mantle are mostly simple. The foregut is about to appear from the atrial opening, forming a proboscis. There are as many as 18 folds formed along the pedal groove (fig. 5C). The mantle-cavity or the so-called cloaca is spacious. It is provided with a considerable number of radiating gill-lamellae, a feature most characteristic to the family and the genus. The opening of the mantle-cavity is terminal and posterior. A dorso-terminal sense organ was not found.

Internal characters: The foregut acting as a proboscis is in the form of a simple tube (figs. 3 and 7A), and not divided into 3 successive parts defined in the Antarctic *Neomenia*. In the present specimen, there are radiating muscle bands closely set around the length of the foregut. A radula is missing. There is no formation of a midgut caecum, either. The midgut proper is well-developed. The wall is closely set on both sides with a series of vertical glandular folds, leaving only a narrow lumen

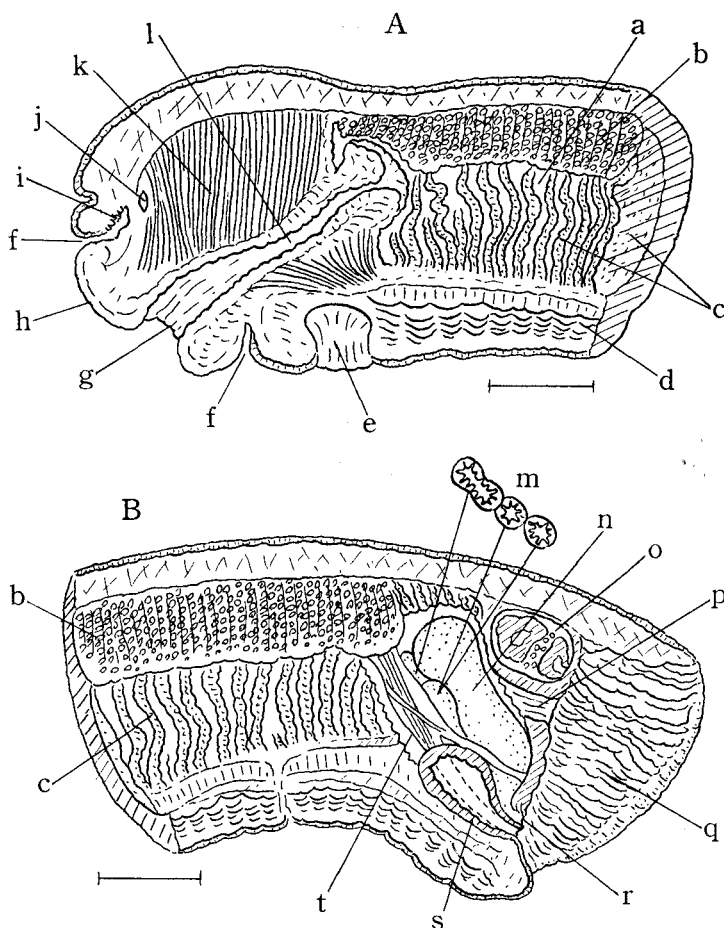


Fig. 7. *Neomenia yamamotoi* Baba, spec. nov.

A. Median longitudinal section of the anterior part of the body, seen from the left side (scale 10 mm).

B. Median longitudinal section of the posterior part of the body, seen as above (scale 10 mm). The right wall of the hindgut is partly cut off.

a - lateral lumen of the midgut; b - gonad; c - vertical glandular folds of the midgut; d - pedal folds; e - prepedal pit; f - atrial opening; g - mouth; h - proboscis; i - cirri (?); j - right half of the cerebral ganglia; k - muscle bands; l - foregut; m - pericardioduct of the right side; n - spawning duct of the right side; o - pericardium enclosing a heart and eggs; p - anus; q - gill-folds; r - genital opening; s - vaginal pouch; t - copulatory stylet sheath of the right side.

for digestion (figs. 2, 4, 5B and 7B). No piece of any food material was visible throughout the midgut. The hindgut is short. The anus opens in the middle of the mantle-cavity. The united cerebral ganglia are extremely small in size. It appears that the right half of them is provided with 10 nerves of unknown distribution (fig. 8).

The hermaphroditic gonads, fundamentally paired, are transformed in the state of maturity into ovaries, each packed densely with yolk-laden eggs (figs. 2 and 5B). The genital duct identified as such in this paper, is made up of a long and winding

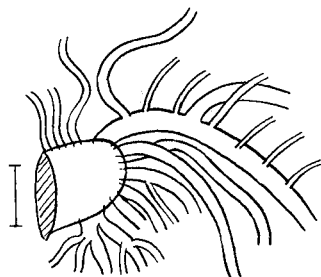


Fig. 8. *Neomenia yamamotoi* Baba, spec. nov.
Right cerebral ganglion with its nerves (scale 1 mm).

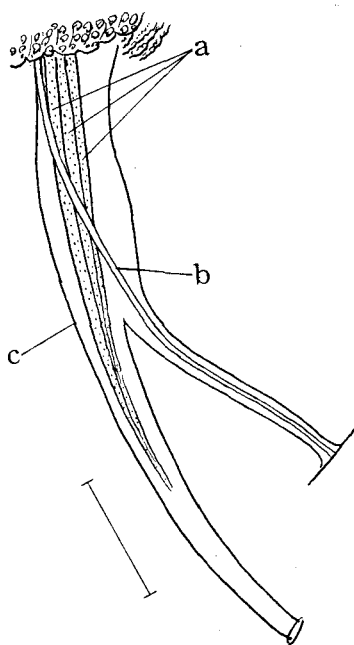


Fig. 9. *Neomenia yamamotoi* Baba, spec. nov.
Copulatory stylet sheath of the right side, enlarged (scale 5 mm).
a - stylets; b - muscle band; c - stylet sheath.

pericardioduct (=coelomoduct) and a massive spawning duct (=mucous gland) (fig. 7B). It seems probable that the right and left genital ducts are united at their posterior extremities. A single vaginal pouch of *Neomenia grandis* Thiele, 1894 is situated immediately below the genital orifice in the median line. On each side of the vaginal pore there occurs an opening of the copulatory stylet sheath which encloses 3 calcareous formations in the interior (fig. 9). The receptaculum seminis and particularly the copulatory stylet gland of the Antarctic *Neomenia* were not made certain in my specimen.

Summary

1. The present specimen is referred to the genus *Neomenia* (Family Neomeniidae) for existence of many folds on the pedal groove as well as on the inner wall of the mantle-cavity. The former are called the pedal folds, and the latter the gill-folds. The absence of a radula and the possession of grooved tegumental spicules are also considered as important for the generic allocation of the species.

2. Within the genus this form is particularly distinguished from the type of the genus and the allies by its larger body that shows some peculiarities in the formation of the genital system, especially in the absence of a copulatory organ or penis. Thus, it is recorded as a new species, *Neomenia yamamotoi*, based on the type which was taken from the location off Muroran, Hokkaido, northern Japan. The distribution of this new species seems to be limited in the area affected by the cold current, Oya Siwo, from the north.

3. An anatomical comparison was made on some points between the present new species and another gigantic form of *Neomenia* derived from the sea adjacent to the Antarctic. This was made possible by the personal communication from Dr. L. v. Salvini-Plawen.

4. The type of *Neomenia yamamotoi* spec. nov. is stoutish in appearance, and measures 100 mm long by 30 to 35 mm thick. The mouth opens within the atrium. The foregut functions as a proboscis. A radula is absent. The wall of the midgut is built of a series of glandular folds on either side. The paired gonads are filled with eggs. The genital duct on each side appears to be made up of a winding pericardioduct and a massive spawning duct. It is accompanied with a copulatory stylet sheath containing 3 calcareous stylets within it. An unpaired vaginal pouch is present. The mantle-cavity at the rear end of the body forms a well-developed respiratory chamber.

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